October 20, 2003

MEMORANDUM TO: Janet R. Schlueter, Chief
High-Level Waste Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

FROM: Robert M. Latta, Sr. On-Site Licensing Representative ***/RA/***
Repository Site Section
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Jack D. Parrott, Sr. On-Site Licensing Representative ***/RA/***
Repository Site Section
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Office of Nuclear Material Safety
and Safeguards

SUBJECT U.S. NUCLEAR REGULATORY COMMISSION ON-SITE LICENSING REPRESENTATIVES' REPORT ON THE YUCCA MOUNTAIN PROJECT FOR JULY 1, 2003, THROUGH AUGUST 31, 2003

The purpose of this memorandum is to transmit the U.S. Nuclear Regulatory Commission (NRC) On-Site Representatives' (ORs) report for the period of July 1, 2003, through August 31, 2003.

This report highlights a number of Yucca Mountain Project activities of potential interest to NRC staff. The ORs continue to respond to requests from NRC Headquarters staff to provide various documentation and feedback related to Key Technical Issues (KTIs) and their resolution. During this reporting period, the ORs continued to observe activities associated with Yucca Mountain site activities, KTIs, and audits. The ORs also attended various meetings and accompanied NRC staff on visits to Yucca Mountain.

If you have any questions on this report or its attachments, please call Robert Latta on (702) 794-5048, or Jack Parrott on (702) 794-5047.

Attachments:
1. U.S. Nuclear Regulatory Commission On-Site Licensing Representatives' Report, Number OR-03-04 for the Reporting Period of July 1, 2003 Through August 31, 2003
2. Figure 1: ESF/ECRB Plan View Alcove, Niche and Borehole Testing Locations
3. Table 1: U.S. NRC On-Site Licensing Representatives' Tracking Report for Open Items
4. Table 2: Current Test Activities by Scientific Investigation Test Plan

cc: See attached list

Memorandum to Janet R. Schlueter, Chief, dated: October 20, 2003
cc:

A. Kalt, Churchill County, NV
R. Massey, Churchill/Lander County, NV
I. Navis, Clark County, NV
E. von Tiesenhausen, Clark County, NV
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D. Chavez, Nye County, NV
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J. Larson, White Pine County, NV
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M. Corradini, NWTRB
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P. Johnson, Citizen Alert
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B. Helmer, Timbisha Shoshone Tribe
R. Arnold, Pahrump Paiute Tribe
G. Hernandez, Las Vegas Paiute Tribe
R. Boland, Timbisha Shoshone Tribe

cc: (Continued)

R. Clark, EPA

K. Finfrock, NV Congressional Delegation

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R. McCullum, NEI

S. Kraft, NEI

J. Kessler, EPRI

D. Duncan, USGS

R. Craig, USGS

W. Booth, Engineering Svcs, LTD

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L. Lehman, T-REG, Inc.

S. Echols, ECG

J. Bacoch, Big Pine Paiute Tribe of the Owens Valley

P. Thompson, Duckwater Shoshone Tribe

C. Marden

T. Kingham, GAO

D. Feehan, GAO

E. Hiruo, Platts Nuclear Publications

J. Birchim, Yomba Shoshone Tribe

E. Mueller, BSC/PR

N. Hunemueller, DOE/ORD

C. Meyers, Moapa Paiute Indian Tribe

R. Wilder, Fort Independence Indian Tribe

D. Vega, Bishop Paiute Indian Tribe

J. Egan, Egan, Fitzpatrick & Malsch

J. Leeds, Las Vegas Indian Center

J.C. Saulque, Benton Paiute Indian Tribe

C. Bradley, Kaibab Band of Southern Paiutes

R. Joseph, Lone Pine Paiute-Shoshone Tribe

L. Tom, Paiute Indian Tribes of Utah

E. Smith, Chemehuevi Indian Tribe

D. Buckner, Ely Shoshone Tribe

D. Crawford, Inter-Tribal Council of NV

V. Guzman, Inter-Tribal Council of NV (Chairwoman, Walker River Paiute Tribe)

D. Eddy, Jr., Colorado River Indian Tribes

H. Jackson, Public Citizen

J. Wells, Western Shoshone National Council

I. Zabarte, Western Shoshone National Council

H. Urban, NV Congressional Delegation

M. Henderson, NV Congressional Delegation

A. Benson, DOE/PR

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The purpose of this memorandum is to transmit the U.S. Nuclear Regulatory Commission (NRC) On-Site Representatives' (ORs) report for the period of July 1, 2003, through August 31, 2003.

This report highlights a number of Yucca Mountain Project activities of potential interest to NRC staff. The ORs continue to respond to requests from NRC Headquarters staff to provide various documentation and feedback related to Key Technical Issues (KTIs) and their resolution. During this reporting period, the ORs continued to observe activities associated with Yucca Mountain site activities, KTIs, and audits. The ORs also attended various meetings and accompanied NRC staff on visits to Yucca Mountain.

If you have any questions on this report or its enclosures, please call Robert Latta on (702) 794-5048, or Jack Parrott on (702) 794-5047.

Attachment(s): 1. U.S. Nuclear Regulatory Commission On-Site Licensing Representatives' Report, Number OR-03-04 for the Reporting Period of July 1, 2003 Through August 31, 2003
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4. Table 2: Current Test Activities by Scientific Investigation Test Plan

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NAME	RLatta/vlm ***/RA/***	JParrott ***/RA/***	LCampbell ***/RA/***	NKStablein ***/RA/***
DATE	10/01/2003	10/01/2003	10/20/03	10/17/03

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U.S. NUCLEAR REGULATORY COMMISSION

ON-SITE LICENSING REPRESENTATIVES' REPORT

NUMBER OR-03-04

FOR THE REPORTING PERIOD OF JULY 1, 2003 THROUGH AUGUST 31, 2003

/RA/

Robert M. Latta
Sr. On-Site Licensing Representative
High-Level Waste Branch
Division of Waste Management

/RA/

Jack D. Parrott
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Reviewed and Approved By: **/RA/**

Larry Campbell
Section Chief
Repository Site Section
High-Level Waste Branch
Division of Waste Management

Enclosure

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ON-SITE LICENSING REPRESENTATIVE REPORT
NUMBER OR-03-04

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ACRONYMS AND ABBREVIATIONS

ACRO	TITLE
AECL	Atomic Energy of Canada, Limited
AMR	Analysis Modeling Report
AOI	Audit Observation Inquiry
AP	Administrative Procedure
BSC	Bechtel SAIC Company, LLC
CAQ	Condition Adverse to Quality
CAR	Corrective Action Report
CR	Condition Report
DOE	U.S. Department Of Energy
DR	Deficiency Report
ECRB	Enhanced Characterization of the Repository Block
ESF	Exploratory Studies Facility
ES&H	Environmental Safety & Health
EWDP	Early Warning Drilling Program
FY	Fiscal Year
KTI	Key Technical Issue
LA	License Application
LP	Line Procedure
MII	Management Improvement Initiative
MOR	Monthly Operating Review
NRC	U.S. Nuclear Regulatory Commission
OCRWM	Office of Civilian Radioactive Waste Management
OR	On-Site Representative
ORD	Office of Repository Development
OQA	Office of Quality Assurance

ACRONYMS AND ABBREVIATIONS - continued -

ACRO	TITLE
QA	Quality Assurance
QARD	Quality Assurance Requirements Description
RCD	Root Cause Determinations
SCWE	Safety Conscious Work Environment
SWO	Stop Work Order
TSPA-LA	Total System Performance Assessment - License Application
UCCSN	University and Community College System of Nevada
USGS	U. S. Geological Survey
YMP	Yucca Mountain Project

EXECUTIVE SUMMARY

REVIEW OF ROOT CAUSE DETERMINATION FOR CORRECTIVE ACTION REPORT (CAR) BSC(O)-03-C-097

The Department of Energy's (DOE's) Office of Quality Assurance (OQA) initiated a Stop Work Order (SWO) No. BSC (O)-03-C-097, on March 4, 2003, related to the Bechtel SAIC Company, LLC (BSCs) procedure development process. Subsequent to the issuance of the SWO, OQA initiated Corrective Action Report (CAR) No. BSC (O)-03-C-097, on March 6, 2003, which documented that contrary to the requirements of the Quality Assurance Requirements Description (QARD) and Administrative Procedure (AP)-5.1Q, "Plan and Procedure Preparation, Review, and Approval," BSC failed to effectively implement the procedure development processes during the preparation, review and approval of BSC-AP-ATS-0001, "Procedure Development and Use," and related processing of procedures.

As described in BSC's Root Cause Determination (RCD) for CAR BSC (O)-03-C-097, several common factors were identified, including the determination that: 1) accountability for following procedures was ineffective; 2) inadequate supervision; 3) lack of identification of behavior-based corrective actions in recent related Deficiency Reports(DRs); and 4) lack of signature accountability and integrity. The RCD also identified that a contributing factor to the deficiencies identified in this CAR involved personnel choosing not to comply with existing procedures.

During this reporting period, the On-Site Representatives (ORs) evaluated the amended response to CAR BSC (O)-03-C-097 dated August 18, 2003, and the verification of corrective actions associated with this significant condition adverse to quality. As stated in OQA's verification report, the root cause analysis for CAR-BSC (O)-03-C-097 determined that the identified deficiencies were the result of deliberate noncompliance that was indirectly tied to perceived schedule pressures. OQA's verification report concluded that SWO BSC (O)-03-097 had been lifted on July 31, 2003, as a result of the approved CAR response and that CAR BSC (O)-03-C-097 was closed subsequent to the confirmation of corrective actions. Based on the review of the amended response to this CAR and the supplemental comments and clarifications provided by the RCD team, the ORs concurred with OQA's verification of corrective actions associated with this deficiency and the justification for the closure of CAR BSC (O)-03-097.

CAR BSC (B)-03-C-107

On March 14, 2003, BSC issued CAR BSC(B)-03-C-107. This CAR, which was self-identified, documented numerous examples of DRs and CARs related to data used in technical products, which cumulatively represented inadequate implementation of QARD requirements and ineffective corrective actions to prevent recurrence.

Based on the review of the documentation associated with the initial response to this CAR, the ORs generally determined that appropriate corrective actions had been initiated related to CAR-(B)-03-C-107. However, as previously documented in OR Report 03-03, dated August 15, 2003, a concern was identified relating to the protracted length of time to complete the RCD for CAR BSC(B)-03-C-107. At the conclusion of this reporting period, the RCD team had not completed their investigation, and the anticipated date for providing the RCD to DOE OQA had slipped to the early September time frame. Therefore, **OR Open Item 03-04** will remain open pending the completion of the RCD for CAR BSC (B)-03-C-107, and the evaluation of the basis for allowing this quality affecting activity to remain open for over five months without resolution.

MANAGEMENT DIRECTED SOFTWARE STAND-DOWN

On June 7, 2001, the BSC General Manager issued a limited management stand-down on software development. This directive resulted from the accumulation of issues regarding the indeterminate status of quality-affecting software being used in technical products. On June 12, 2001, DOE issued CAR Number YMSCO-01-C-002, addressing the following software control problems: 1) Deficiencies in procedure compliance (lack of effective independent verification and validation); 2) lack of supplemental procedures (software development and life cycles); and 3) lack of effective training and implementation regarding software development.

On July 23, 2003, the limited management stand-down on software development was ended subsequent to the completion of the BSC established criteria. In order to confirm the adequacy of the corrective actions related to software used in technical products, the ORs reviewed recently issued DRs concerning software development. As a result of this review, a potential item of concern was identified regarding the use of unqualified software codes. Specifically, DR BSC (B)-03-D-170, dated June 30, 2003, identified the use of unqualified software during the development of Analysis Modeling Reports (AMRs). This item is of concern because it appeared to be a recurrence of the issues, which resulted in the limited management stand-down on software development.

At the conclusion of this reporting period, DR BSC (B)-03-D-170 remained open. The ORs also determined that BSC has established a position, as stated in a Memorandum from BSC's Performance Assessment organization to DOE's OQA, dated June 23. 2003, that the "....use of unqualified software is acceptable with the condition that the requirements of Supplement 1[of the QARD], paragraph 1.2.4 are met before the technical product which describes the model or analysis has completed checking." Furthermore, it was determined that OQA has been requested by BSC, to provide a position paper on the use of unqualified software in AMRs currently being generated.

Based on the ORs review of the requirements contained in Supplement 1, of the QARD, it was apparent that software must meet the life cycle requirements set forth in paragraph 1.2.3, and be appropriately base-lined and controlled in accordance with paragraph 1.2.4, prior to being obtained from software configuration management. As such, the continued use of unqualified software in quality affecting technical products appears to be in conflict with the governing requirements of the implementing procedures, and the QARD. Therefore, pending the disposition of this apparent deviation from the requirements of the QARD, this issue is identified as **OR Open Item 03-05**

MANAGEMENT IMPROVEMENT INITIATIVE COMPLETION STATUS (MII)

As of August 31, 2003, the Project reported that 29 of the Management Improvement Initiative (MII) action statements (approximately 83%) had been confirmed completed. However, the remaining six of the scheduled actions, currently with the responsible managers for action, have not been reported as complete as of the end of August 2003. These remaining MII actions, include four related to procedures, one concerning the Corrective Action Program, and one involving a Safety Conscious Work Environment (SCWE). Although a draft set of effectiveness indicators associated with the MII have been developed, the Project's final set of performance indicators were still under development at the end of August 2003. The ORs also noted that the effective self-identification of deficiencies is an anticipated outcome of the MII. However, current indications are that line identified items for BSC remained at approximately 48 percent, which is below the Project goal of 60 percent.

At the end of this reporting period, 9 of the 12 actions related to CAR BSC-01-C-001, (open for 850 days) have been completed and verified by OQA. Three action items are with OQA and are currently in the verification and confirmation process.

Corrective actions related to CAR BSC-01-C-002, (open for 810 days) remain behind schedule. As of the end of August 2003, 14 of the 25 actions have been completed and verified as satisfactory, 3 actions have been reported as complete and are undergoing verification. Eight actions are in progress with the responsible manager, and one action concerning the performance of a self-assessment has been completed and is in the confirmation process. The over 2 year old management imposed stand-down on software development, related to CAR BSC-01-C-002, was lifted on July 23, 2003.

The ORs also conducted an initial review of commitments made by DOE in response to the NRC concerns on the MII expressed during the April 30, 2003, Management Meeting. Although confirmation packages have not yet been developed for these items, the ORs will monitor the completion of activities related to the 13 commitments contained in DOE's 30-day response letter and the results will be documented in a future OR report.

SAFETY CONSCIOUS WORK ENVIRONMENT SURVEY (SCWE)

On June 27, 2003, BSC conducted the second quarterly SCWE survey. The purpose of this initiative was to provide a baseline for improvements in the Project's SCWE program, and to evaluate the effectiveness of SCWE implementation efforts. Similar to the initial survey, which was performed at the end of March 2003, this survey was conducted using questions typical of those employed in the nuclear industry, and was administered to 25 percent of the Yucca Mountain Project (YMP) employees.

The results of the survey appear to represent a slight increase in employee satisfaction for the measured parameters, which included SCWE, Employee Concerns Program, Corrective Action Program, employee responsibilities, and management expectations. Although the first quarterly survey resulted in only a 37 percent program-wide response rate, the latest survey had a response rate of approximately 50 percent. This increased response rate should allow the Project to further evaluate employee perceptions and attitudes on the Project.

The results of this survey are currently being evaluated by Project management, to determine the actions necessary to address these issues, such that performance can be monitored in future surveys. The third quarterly survey will be combined with a web-based survey designed to evaluate both the SCWE and the Project's overall work culture. The results of this evaluation will be used in conjunction with the two previous quarterly surveys, to monitor and trend employee feedback, and to improve performance.

MONTHLY OPERATING REVIEW

During this reporting period, the ORs attended the DOE Monthly Operating Review (MOR) for the July performance data. Areas addressed during these meetings included detailed discussions concerning Project activities, management initiatives, QA program issues, licensing, Environmental Safety and Health (ES&H)/Site Operations, Public Affairs, and Business Administration. Additional topics discussed during the MOR involved the review of current issues, including design solutions for LA, response to NRC 30 day letter, LA schedule variance, Office of Civilian Radioactive Waste Management (OCRWM)/BSC Concerns program status, Project accomplishments and the status of MII action items.

During this meeting both DOE and BSC management emphasized the need to improve performance in the areas related to: LA, corrective actions, procedural compliance, accountability, and effective performance indicators. Additionally, the responsible managers for each of the organizations provided the overall status of their respective programs using the standard industry identifiers of red, yellow and green to characterize overall performance. Although the set of primary and secondary indicators related to Work Execution and Management are still under development, the color coding of the activities including trend information appear to be appropriate and the management direction provided in these meetings is to maintain adverse indicators until sustained improvements have been achieved. This increased focus and attention on improving performance, and enhanced management processes related to quality issues, represents an overall improvement in Project controls and continues to be identified as a management strength related to the YMP.

GENERAL SITE ISSUES

During the evening of July 30, 2003, and morning of July 31, 2003, the site experienced heavy rains. These rain events caused erosional damage to site roads, a power outage, and an evacuation of the site. In addition, a program to reduce the size of the surface operational and storage areas at the site commenced during this reporting period.

EXPLORATORY STUDIES FACILITY TESTING

The drift-scale thermal test in the exploratory studies facility continued its cool-down phase. Monitoring of boreholes in the access observation drift continues.

ENHANCED CHARACTERIZATION OF REPOSITORY BLOCK TESTING

An NRC OR participated in an unventilated entry beyond the sealed Enhanced Characterization of Repository Block Testing (ECRB) bulkheads at Stations 22+01, 25+03, and 25+99 in July 2003. Preparations are being made to begin tracer studies in the large-plot test in Alcove 8.

SURFACE-BASED FIELD TESTING

Drilling on some of the Nye County Early Warning Drilling Program (EWDP) Phase IV wells was completed during this reporting period. Continued deep water well drilling in Inyo County, California, has been put on hold until next fiscal year. Cuttings/core from the Pena Blanca, Mexico, site (natural analog program) will be tested at a later date.

LABORATORY STUDIES

During this reporting period, post-migration radiometric analysis on the tuff blocks continued.

UPCOMING NEW TESTS AND STUDIES

The thermal management dispersion test at the Atlas facility is planned for fiscal year (FY)2004.

REPORT DETAILS

INTRODUCTION

The principal purpose of the On-Site Representatives' (ORs) report is to inform U.S. Nuclear Regulatory Commission (NRC) managers, staff, and contractors of information on the U.S. Department of Energy (DOE) programs in repository design, performance assessment, performance confirmation, and environmental studies that may be useful in fulfilling NRC's role during prelicensing consultation. The primary focus of this and future OR reports will be on DOE's programs for subsurface- and surface-based testing, performance assessment, data management systems, and environmental studies. Relevant information includes new technical data, DOE's plans and schedules, and the status of activities to pursue the License Application (LA). The ORs also take part in activities associated with resolving NRC Key Technical Issues (KTIs). This report covers the period of July 1, 2003, through August 31, 2003.

OBJECTIVES

The ORs mission is to serve principally as a point of prompt information exchange and to identify preliminary concerns with site investigations and potential licensing issues. The ORs carry out this role by gathering and evaluating information, identifying concerns, and raising more significant issues to NRC management's attention. Communication with DOE is accomplished by exchanging information on data, plans, schedules, documents, activities and pending actions, and resolution of issues. The ORs interact with DOE scientists, engineers, and managers, with input from NRC Headquarters management, regarding the implementation of NRC policy, programs, and regulations. The ORs also focus on such issues as quality assurance (QA), design controls, data management systems, performance assessment, and KTI resolution. A primary OR role is to identify areas in site studies, activities, or procedures that may be of interest or concern to the NRC staff.

1 QA AND ENGINEERING

1.1 Review of Root Cause Determination (RCD) for Corrective Action Report (CAR) Bechtel SAIC Company, LLC (BSC) BSC (O)-03-C-097

As previously documented in OR Report 03-01, dated April 14, 2003, Office of Quality Assurance (OQA) initiated a Stop Work Order (SWO) No. BSC (O)-03-C-097, on March 4, 2003, related to the Bechtel SAIC Company, LLC (BSC's) procedure development process. Subsequent to the issuance of the SWO, OQA initiated CAR No. BSC (O)-03-C-097, on March 6, 2003, which documented that contrary to the requirements of the Quality Assurance Requirements Description (QARD) and Administrative Procedure (AP)-5.1Q, "Plan and Procedure Preparation, Review, and Approval," BSC failed to effectively implement the procedure development processes, during the preparation, review and approval of BSC-AP-ATS-0001, and related processing of procedures. The CAR also concluded that procedure BSC-AP-ATS-0001, "Procedure Development and Use," was not acceptable for use based on the significant condition adverse to quality identified by OQA's surveillance team.

As described in BSC's Root Cause Determination (RCD) for CAR BSC (O)-03-C-097, several common factors were identified including the determination that: 1) Accountability for following procedures was ineffective, 2) inadequate supervision, 3)

lack of identification of behavior-based corrective actions in recent related deficiency reports, and 4) lack of signature accountability and integrity.

The RCD also identified that a contributing factor to the deficiencies identified in CAR BSC (O)-03-C-097 involved personnel choosing not to comply with existing procedures. Recommendations from the RCD identified the need to: 1) enforce procedure compliance, 2) revise the review and comment process, 3) establish and enforce the policy on importance and integrity of signatures, 4) assure the corrective action program addresses both behavior based issues and process errors, and 5) hold management and supervision accountable.

As a result of the OR's initial review of the RCD, it was noted that the document appeared to identify the primary root causes. However, the ORs identified several issues regarding the completeness of the document that were provided to Project management for clarification. These issues concerned the RCD content which did not explicitly consider a barrier analysis, nor did it appear to address the aggregate of the problems associated with CAR BSC (O)-03-C-097.

During this reporting period the ORs evaluated the amended response to CAR BSC (O)-03-C-097, dated August 18, 2003, and the verification of corrective actions associated with this significant condition adverse to quality. Specifically, the ORs reviewed OQA's confirmation activities documented in the amended complete response for CAR BSC (O)-03-C-097, including the immediate and remedial actions, extent of condition, root cause determination, and the actions to preclude recurrence. As stated in OQA's verification report, the root cause analysis for CAR-BSC(O)-03-C-097 determined that the identified deficiencies were the result of deliberate noncompliance that was indirectly tied to perceived schedule pressures. The verification report also stated, that DR BSC (O)-03-038 identified a previous condition involving failure to prepare the necessary requirements traceability network matrices, as well as, examples of missing or incomplete signatures for review records. Accordingly, the report noted that a pattern of noncompliance, based on the extent of conditions in DR BSC (O)-03-038, indicated that the deficiences documented in CAR-097, may not have been limited to just those personnel involved in the development of procedure BSC-AP-ATS-0001.

The verification report indicated that although DR BSC (O)-03-038 identified inattention-to-detail and complexity of the review record form as apparent causes, an examination of the 11 listed procedures, by OQA, indicated that the established process controls had effectively produced several compliant record packages. This determination corroborated the root cause team's conclusion that the problem was the result of behavior-based issues rather than process-control inadequacies. Therefore, as stated in OQA's verification report, the Project's efforts to revise procedural (process) controls may not result in improved performance. However, the verification report did indicate that increased management emphasis on conformance to procedure requirements should prevent recurrence.

OQA's verification report also stated that "Although Bechtel SAIC Company, LLC did not conduct a comprehensive extent of condition investigation for this CAR, it was verified that procedure BSC-AP-ATS-0001 was unique in its volume of errors." The report further stated that although the extent of condition performed for DR BSC (O)-03-038 appeared adequate, it was limited to a 6 month period and the corrective actions did not result in revision of the affected records. Similarly, the records package for procedure BSC-AP-ATS-0001 was not corrected. Nonetheless, it was noted in the verification

report that the procedure was rescinded and not reissued. Therefore, correction of the associated documentation did not appear to be a significant issue with respect to resolution of the corrective actions for CAR BSC(O)-03-C-097.

As a result of OQA's verification review of the root cause analysis for CAR-BSC(O)-03-C-097, several concerns and areas of clarification were identified. These issues were addressed by the root cause team in an effort to provide additional clarification and justification for the team's conclusions. Based on the submitted report and supplemental comment clarifications, OQA concurred with the root cause team's conclusions. However, OQA's verification report noted that the Office of Civilian Radioactive Waste Management (OCRWM) Employee Concerns Manager had identified an item with respect to the root cause conclusion involving Safety Conscious Work Environment (SCWE) issues, which were considered to be outside the scope of the CAR verification process.

In conclusion, OQA's verification report stated that the associated SWO No. BSC (O)-03-097 had been lifted on July 31, 2003, as a result of the approved CAR response and that CAR BSC(O)-03-C-097 was closed subsequent to the confirmation of corrective actions. Based on the review of the amended response to CAR BSC(O)-03-C-097 and the supplemental comment clarifications provided by the RCD team, the ORs concurred with OQA's verification of corrective actions associated with this deficiency and the justification for the closure of CAR BSC(O)-03-C-097.

1.2 Corrective Action Report BSC(B)-03-C-107 (Data Management and Utilization)

On March 14, 2003, BSC issued CAR BSC(B)-03-C-107. This CAR, which was self-identified, documented numerous examples of DRs and CARs related to data used in technical products, which cumulatively represented inadequate implementation of QARD requirements and ineffective corrective actions to prevent recurrence. In response to the issues identified in CAR BSC(B)-03-C-107, the Manager of Projects initiated actions to confirm the qualification status and application of data within each Analysis Modeling Report (AMR) directly used as input for the Total System Performance Assessment-License Application (TSPA-LA). Additionally, a data confirmation plan to define the acceptance process, implementation schedule, and resources was initiated.

Based on the review of the documentation associated with the initial response, the ORs generally determined that appropriate corrective actions had been initiated related to CAR BSC(B)-03-C-107. However, as previously documented in OR Report 03-03, dated August 15, 2003, a concern was identified (OR Open Item 03-04) related to the protracted length of time to complete the RCD for CAR BSC(B)-03-C-107. Specifically, at the conclusion of this reporting period, the RCD team had not completed their investigation and the anticipated date for providing the RCD to DOE OQA had slipped to the early September time frame. Although there appeared to be some justification for the delayed completion of this quality affecting activity, it is noted that the timely performance of the RCD is a required action for CARs and that this critical activity must be completed in order to effectively determine the extent of condition. Therefore, **OR Open Item 03-04** will remain open pending the completion of the RCD for CAR BSC(B)-03-C-107, and the evaluation of the basis for allowing this quality affecting activity to remain open for over 5 months without resolution,.

1.3 Management Directed Software Stand-Down

On June 7, 2001, the BSC General Manager issued a limited management stand-down on software development. This directive resulted from the accumulation of issues

regarding the indeterminate status of quality-affecting software being used in technical products. On June 12, 2001, DOE issued CAR Number BSC-01-C-002, addressing the following software control problems: 1) Deficiencies in procedure compliance (lack of effective independent verification and validation); 2) lack of supplemental procedures (software development and life cycles); and 3) lack of effective training and implementation regarding software development.

On July 23, 2003, the limited management stand-down on software development was ended. As stated in a memorandum from Manager of Projects, dated June 10, 2003, BSC established the criteria for lifting the stand-down in their response to CAR BSC 01-C-002, dated June 26, 2001. These criteria included the completion of the following corrective actions regarding quality-affecting software used in technical products:

- Completion of three-tiered training on Software Management Procedure AP-SI.1Q, Revision 3, ICN 1, as described in the remedial actions for CAR BSC 01-C-002.
- Completion of the root cause determination for CAR BSC-01-C-002 to assure that all contributing factors were identified.
- Satisfactory resolution of factors identified in the Root Cause determination that would be necessary to assure that software development is carried out in compliance with procedure AP-SI.1Q, "Software Management."

In order to confirm the adequacy of the corrective actions related to software used in technical products, the ORs reviewed recently issued DRs concerning software development. As a result of this review a potential item of concern was identified regarding the use of unqualified software codes. Specifically, DR BSC (B)-03-D-170, dated June 30, 2003, identified the use of unqualified software during the development of AMRs. The stated requirements include reference to AP-SI.1Q, Section 2.2 which indicates that software used for quality affecting activities shall be qualified per the procedure, and AP-SIII.9Q, "Scientific Analysis", Section 5.3, that states that if software is used, ensure that it is controlled and documented in accordance with AP-SI.1Q. Furthermore, the DR references the requirements of the QARD, Section 5.2.4, which states that when work cannot be done as described in a procedure, the work shall be stopped until the procedure is revised.

Contrary to the above requirements, examples of technical products (AMRs) were identified that used unqualified software codes. As described in the amended response to this DR, an investigation of 32 Natural System AMRs and technical reports submitted for checking found 2 technical products that used unqualified software to produce intended final reports. At the conclusion of this reporting period, the DR remained open. However, the ORs determined that BSC has established a position, as stated in a Memorandum from BSC's Performance Assessment organization to DOE OQA, dated June 23, 2003, that the "....use of unqualified software is acceptable with the condition that the requirements of Supplement 1, paragraph 1.2.4 are met before the technical product which describes the model or analysis has completed checking." Furthermore, it was determined that OQA had been requested, by BSC, to provide a position paper on the use of unqualified software in AMRs, currently being generated.

Based on the ORs' review of the requirements contained in Supplement 1, of the QARD, it was apparent that software must meet the life cycle requirements set forth in paragraph 1.2.3, and be appropriately base-lined and controlled in accordance with paragraph 1.2.4, prior to being obtained from software configuration management. As

such, the continued use of unqualified software in quality affecting technical products appears to be in conflict with the governing requirements of the implementing procedures and the QARD. Therefore, pending the disposition of this apparent deviation from the requirements of the QARD, this issue is identified as **OR Open Item 03-05**.

1.4 Management Improvement Initiative (MII) Completion Status

There are 29 discrete action statements associated with the 5 MII Action Plans (6 Action Statements have dual responsibility for a total of 35 discretely monitored activities.) Additionally, there are 37 Action Statements related to CARs BSC-01-C-001 (Models) and BSC-01-C-002 (Software). As of August 31, 2003, the Project reported that 29 of the MII action statements (approximately 83%) had been confirmed completed. However, six of the scheduled actions, currently with the responsible managers for action, have not been reported as complete as of the end of August 2003. These remaining MII actions include four related to procedures, one concerning the Corrective Action Program, and one involving SCWE.

Although a draft set of effectiveness indicators associated with the MII have been developed, the Project's final set of performance indicators were still under development at the end of August 2003. The ORs also noted that the effective self-identification of deficiencies is an anticipated outcome of the MII. However, current indications are that line identified items for BSC remained at approximately 48 percent, which is below the Project goal of 60 percent.

At the end of this reporting period, 9 of the 12 actions related to CAR BSC-01-C-001, (open for 850 days) have been completed and verified by OQA. Three action items are with OQA and are currently in the verification and confirmation process. Corrective actions related to CAR BSC-01-C-002, (open for 810 days) remain behind schedule. As of the end of August 2003, 14 of the 25 actions have been completed and verified as satisfactory, 3 actions have been reported as complete and are undergoing verification. Eight actions are in progress with the responsible manager, and one action concerning the performance of a self-assessment has been completed and is in the confirmation process. The over 2 year old management imposed stand-down on software development, related to CAR BSC-01-C-002, was lifted on July 23, 2003.

The ORs reviewed eight additional MII confirmation packages during this reporting period. Based on the results of this review the ORs continue to find the confirmation process to be an effective mechanism for ensuring completion of the MII commitments and the associated documentation. Although progress has been made in addressing corrective actions in the MII, the ORs identified a concern regarding four of the remaining MII actions related to programs that are behind schedule. Specifically, the MII actions to implement a single corrective action program by December 2002 is overdue, and the establishment of a set of new or revised DOE/BSC program procedures, targeted for completion by April 2003 is behind schedule (estimated completion November 2003.) Accordingly, the ORs will continue to monitor the implementation of the MII corrective actions and the development of effective performance indicators. These issues will also be potential areas for discussion at the next NRC/DOE Quarterly QA and Quarterly Management meetings, scheduled for November 12-13, 2003.

The ORs also conducted an initial review of commitments made by DOE in response to the NRC concerns expressed during the April 30, 2003, Management Meeting. Although confirmation packages have not yet been developed for these items, the ORs will monitor the completion activities related to the thirteen commitments contained in DOE's 30 day response letter and the results will be documented in a future OR report.

1.5 Safety Conscious Work Environment (SCWE)

On June 27, 2003, BSC conducted the second quarterly SCWE survey. The purpose of this initiative was to provide a baseline for improvements in the Project's SCWE program and to evaluate the effectiveness of SCWE implementation efforts. Similar to the initial survey which was performed at the end of March 2003, this survey was conducted using questions typical of those employed in the nuclear industry and was administered to 25 percent of the Yucca Mountain Project employees.

The results of the survey appear to represent a slight increase in employee satisfaction for the measured parameters, which included SCWE, Employee Concerns Program, Corrective Action Program, employee responsibilities, and management expectations. Although the first quarterly survey resulted in only a 37 percent program wide response rate, the latest survey had a response rate of approximately 50 percent. This increased response rate should allow the Project to further evaluate employee perceptions and attitudes on the OCRWM program. The results of the second survey showed an apparent improvement in the respective categories as indicated by the following trends:

Positive Attributes (with comparison to the first quarterly survey results)

- Ninety percent indicated that every aspect of SCWE was important (Same as March survey).
- Ninety-four percent agreed that they are responsible for identifying problems and adverse conditions (85 percent in March).
- Seventy-four percent feel they can raise concerns without fear of retaliation (45 percent in March).

Areas for Further Improvement

- Twenty-six percent fear retaliation for raising concerns (55 percent in March).
- Thirty-six percent don't believe a culture exists that is conducive to raising concerns (55 percent in March).
- Forty-seven percent don't believe that the resolution of safety and quality issues through the corrective action program is effective (60 percent in March).
- Fifty-three percent don't believe the Corrective Action Program is used effectively to resolve conditions adverse to quality in a timely manner (59 percent in March).

The results of this survey are currently being evaluated by Project management to determine the actions necessary to address these issues such that performance can be monitored in future surveys.

Current Project plans are to combine with the third quarterly survey with a web-based survey designed to evaluate both the SCWE and the Project's overall work culture. The results of this evaluation, scheduled for completion in early October, will be used in conjunction with the two previous quarterly surveys to monitor and trend employee feedback and to improve performance.

1.6 Monthly Operating Review (MOR)

During this reporting period the ORs attended the DOE Monthly Operating Report (MOR) meeting covering the July performance data. Areas addressed during these meetings included detailed discussions concerning Project activities, management initiatives, QA program issues, licensing, Environmental Safety and Health (ES&H)/Site Operations, public affairs, and business administration. Additional topics discussed during the MOR involved the review of current issues including design solutions for LA, response to NRC 30 day letter, LA schedule variance, OCRWM/BSC concerns program status, Project accomplishments and the status of MII action items.

With respect to the performance of oversight activities, the Project has successfully completed several joint DOE/BSC audits. This initiative is intended to eliminate audit duplication and result in improved effectiveness and use of resources. QA is also focused on continued improvements in the corrective action program with the goal of implementing a single corrective program by the end of September. Improvements in the trending process and the timely closure of conditions adverse to quality continue to be emphasized.

As indicated during these meetings both DOE and BSC management have emphasized the need to improve performance in the areas related to: LA, corrective actions, procedural compliance, accountability, and effective performance indicators. During these meetings the responsible managers for each of the organizations representing Project Support, Licensing, Safety Analysis, Repository Facilities, and Site Operations, provided the overall status of their respective programs using the standard industry identifiers of red, yellow and green to characterize overall performance. Although the set of primary and secondary indicators related to Work Execution and Management are still under development, the color coding of the activities including trend information appear to be appropriate and the management direction provided in these meetings is to maintain adverse indicators until sustained improvements have been achieved. These presentations typically involved candid evaluations of problem areas including critical path activities and critiques of performance that focus on accountability and methods for improvement. Additionally, the ORs noted that within each functional area, Project management personnel routinely addressed the outstanding DRs and CARs that they have responsibility for and the actions they are taking to resolve these issues. This increased focus and attention on improving performance and enhanced management processes related to quality issues represents an overall improvement in Project controls and continues to be identified as a management strength related to the Yucca Mountain Project.

1.7 Audit Observations

1.7.1 Auditors from OQA conducted a compliance based audit of the quality affecting activities performed by the Office of Repository Development (ORD) during the week of August 4-8, 2003. The audit scope included the examination of procedural adequacy and compliance, as well as, ORD's effectiveness in implementing the requirements of the QA program. Specifically, the audit team examined the implementation of QARD related to the following activities: Organization, QA program, Procurement Document Control, Implementing Documents, Document Control, Control of Purchased Items and Services, Corrective Actions, QA records and Sample Control.

Within the areas examined, the audit team concluded that the procedures were adequate and that program implementation was satisfactory. Based on discussions with cognizant Project personnel, and the review of pertinent records and documents, the audit team determined that ORD was effectively implementing the QA program. The audit team identified one program strength related to the tracking of training needs for ORD personnel and one condition adverse to quality involving an isolated instance of an employee not completing a required training assignment which was effectively corrected during the audit.

The ORs concurred with the audit team's conclusions as presented at the post-audit meeting. During this meeting the ORs acknowledged the professionalism of the OQA audit team, as well as their effectiveness in performing a comprehensive audit. The ORs also recognized the excellent level of cooperation that was provided by DOE's staff during the audit, and the overall improvements identified within ORD.

1.7.2 During the week of August 11-15, 2003, the ORs observed the conduct of two audits.

1.7.2a The first audit (OQAC-OQA-03-09), involved the external evaluation of OQA to determine compliance with the requirements of the QARD. The scope of this compliance-based audit included all of the activities normally performed by OQA - such as audits, surveillances, self-assessments, and nonconformance documentation. In order to maintain the necessary organizational independence, the audit was performed by three DOE QA personnel, who are not directly involved with YMP activities. Specifically, the team leader was from DOE/Idaho Operations Office, and the team members were from DOE's Office of River Protection and DOE's Rocky Flats Environmental Technology Site.

As a result of their evaluations, the audit team identified three Conditions Adverse to Quality (CAQs) and six recommendations. Two of the CAQs, related to signature authority and reference forms, were resolved during the audit and one Condition Report (CR) was initiated identifying inadequate implementation of deficiency documentation controls. These findings were relatively minor and the ORs agreed with audit team's over-all assessment that OQA's implementation of the quality assurance program was effective.

During the audit, the ORs became aware that the audit team leader had been assigned responsibility for conducting audit activities prior to completing the required qualification records. In response to this issue, OQA initiated CR/DR OQA-(O)-03-D-237, on August 14, 2003. The ORs also identified a concern related to the development of the audit checklist. Specifically, procedure AP-18.3Q, "Internal Audit Program," specifies that the audit team member(s) shall prepare the QA checklist to facilitate the audit and ensure appropriate coverage of all elements and/or critical process steps of the audit plan. However, as determined by the ORs, the audit checklist had been developed by the audited organization (OQA) and provided to the audit team. When questioned on this issue the audit team leader indicated that he had signed as the preparer of the checklist following the review of the document and that the team had compared the checklist to the implementing procedures. The audit team leader also indicated that the team had developed additional questions during the course of the audit.

Based on the OR's review of the audit checklist, which encompassed over 140 line items, it was determined that the requisite audit elements and critical process steps were appropriately identified, and that the checklist represented a comprehensive set of characteristics to be evaluated. Therefore, the initial concern related to the

development of the audit checklist was resolved. However, the ORs noted that future audits of this type should conform to the checklist development process delineated in procedure AP-18.3Q.

1.7.2b The ORs also observed portions of BSC audit (BQAC-BSC-03-06) covering repository design activities. This limited-scope compliance based audit, evaluated adherence to the requirements of the QARD, APs and Line Procedures (LPs) related to: Organization, QA Program, Design Control, Procurement Document Control, Implementing Documents, Control of Purchased Items & Services, Corrective Actions, QA Records, Software, and Data Management. The audit team also examined self-assessments, and previously identified deficiencies to determine the continued implementation of corrective actions.

Within the areas examined, five CAQs were identified, two of which were closed during the audit, and one recommendation was identified. The three deficiencies involve: (1) Inadequate justification for not performing inter-discipline reviews; (2) Inadequate implementation of signature control for contracts; and (3) Technical product data errors. The ORs agreed with the audit team's over-all conclusion that the design control processes were effectively implemented, and no Audit Observation Inquiries (AOIs) were identified. However, the ORs did identify two recommendations, concerning the relatively small sample size of technical products available for review, and the need to perform additional oversight activities in order to verify adequate implementation of the design control process.

1.7.3 The ORs observed selected aspects of BSC QA Supplier Audit BQA-AS-03-23 of COGEMA, Inc. that was performed on August 19-20, 2003. This audit evaluated the implementation and effectiveness of the COGEMA quality program in meeting the requirements of BSC Purchase Order PA005391, as they relate to engineering design services.

Within the areas examined, BSC QA identified two relatively minor conditions related to QA records and audits that were promptly corrected during the audit as documented on CR BSC(V)-03-D-254. Although the audit revealed effective implementation of the COGEMA quality program, it was also determined that COGEMA has performed limited design activities to date, consisting of preliminary drawings, and draft System Description Documents. Therefore, as a result of the limited level of design control implementation documents available during this audit, BSC determined that COGEMA will remain on the OCRWM Qualified Supplier List on an annual audit schedule. Furthermore, BSC QA indicated that a follow-up audit will be performed at the COGEMA facilities supporting the engineering design services subsequent to the development of additional quality affecting design products.

Based on the limited number of completed design documents, the ORs concurred with the BSC audit team’s determination to perform additional oversight of the implementation and effectiveness of the COGEMA quality program activities, predicated on increased design activities.

1.8 Review of OR Open Items

During this reporting period, DOE provided additional information on the following OR Open Item. The ORs reviewed this information and the results are provided below.

As documented in OR Report 03-01, dated April 14, 2003, DOE’s OQA identified a significant condition adverse to quality, related to the procedure realignment process. Specifically, OQA Surveillance OQA-SI-03-014 resulted in the issuance of SWO BSC

(O)-03-C-097, and CAR BSC (O)-03-C-097, related to BSCs failure to effectively implement the procedure development process during the preparation, review, and approval of quality affecting procedures. The ORs also noted that three significant issues identified during the surveillance were not explicitly addressed within the context of CAR BSC (O)-03-C-097. These issues involve: 1) identification of inadequate procedural training as a contributing factor; 2) failure of BSC to develop an effective transition plan for the MII procedure improvement process; and 3) an apparent SCWE issue related to the directed release of a quality affecting document with known errors and potential procedural deficiencies. Based on the significance of these three issues, and the repetitive nature of the deficiencies identified in CAR BSC (O)-03-C-097, **OR Open Item 03-01** was identified.

In response to the first issue concerning the failure to establish an effective transition plan, OQA initiated DR ORD (O)-03-108, on April 10, 2003. This DR documented that contrary to the requirements of QARD, Section 2.2.5, "Work Planning," DOE did not develop an adequate planning document to control the transition of procedures. Multiple examples were provided in the condition description that supported the identified deficiency including the cancellation of jointly used procedures with "BSC only" procedures and the development of a new procedure numbering system which failed to consider the need to revise documents that referenced the superseded procedure numbers.

The ORs reviewed the amended response to DR ORD (O)-03-108, which defined the remedial actions necessary to establish compliance, extent of conditions, and apparent cause. Based on the review of the final response to this DR and the associated verification/closure documentation it was determined that adequate actions had been instituted to prevent recurrence. Therefore, the first issue associated with OR Open Item 03-01 is considered closed.

The ORs also evaluated DR BSC (O)-03-109, dated April 10, 2003, concerning the second issue, personnel qualification and training. The requirements related to this issue are contained in QARD Section 2.2.12, which define the need for each affected organization to indoctrinate and train personnel to ensure proficiency and appropriate knowledge of the applicable implementing documents. As described in the DR, based on a review of the training records, none of the personnel involved in the development, review, and approval of procedure AP-ATS-0001, had been assigned or completed training on procedure AP-5.1Q, "Plan and Procedure Preparation, Review and Approval." However, as noted in the response to this deficiency, the functional manager for the affected employees' had determined that this training was not required. Additionally, the DR response indicated that a historical search of the training records dealing with AP-5.1Q revealed that, although not required on their current training matrix, all but one of the employees' identified in the DR had attended AP5.1Q training in the past.

Although the response to the DR contains an extensive description of the training and qualification provided to all BSC employees, including a detailed listing of completed training modules for the identified individuals, there was no acknowledgment that the training was apparently not effective. Specifically, the root cause for CAR BSC (O)-03-C-097 identified that accountability for following procedures was ineffective and that a contributing factor involved personnel choosing not to comply with existing procedures. Based on the OR's reviews within this area, it was not evident that the response to the

DR adequately addressed the identified condition adverse to quality. However, as a result of subsequent discussions with BSC QA personnel, it was determined that in addition to the corrective actions identified in the DR response, several Project initiatives were directed at addressing the issues related to procedural adherence. These initiatives included the performance of rolling quality focus meetings and quality focus groups, as well as the establishment of a prudence board and progressive discipline measures.

Based on the review of the verification/closure documentation associated with the DR and the amplifying information provided by BSC QA, it was determined that adequate actions had been established to prevent recurrence. Therefore, the second issue related to OR Open Item 03-01 is considered closed. However, it is noted that human performance issues related to inadequate procedure implementation continue to be identified in the Project's trending program and increased management attention within this area is warranted.

At the conclusion of this reporting period, the third issue involving an apparent SCWE issue remained open. Therefore, pending the resolution of this issue, **OR Open Item 03-01** remains open.

2. OUTREACH ACTIVITIES

Not at this reporting period.

3 FIELD AND LABORATORY TESTING

3.1 General Issues

Rain Event

During the evening of July 30, 2003, 1.53 inches of rain fell at the site. There were also numerous lightening strikes near the Exploratory Studies Facility (ESF) and flash flooding occurred in Fortymile Wash. The storm resulted in damage to some of the roads leading to and around the site, however site employees were able to reach the site the morning of the 31st of July. Later that morning, another storm approached the site. Due to concerns that this second storm could wash out the site ingress and egress road through Fortymile Wash, a decision was made to perform an emergency evacuation of the site workers. The evacuation went smoothly and according to procedures. Some minor lessons were learned during the evacuation that will be applied to the evacuation procedures. The Primary storm water damage at the site was washed out roads. This damage continues to be repaired at the end of this reporting period.

Power Outages

Lightening strikes and flooding occurring with the 30th of July rain event resulted in a loss of offsite power and communications. Loss of offsite power lasted about one hour. The ESF pad has two 250 Kw backup generators but both failed to start after the power outage because the generator control system was out of service for modifications. Most continuous data collection activities in the ESF and Enhanced Characterization of the Repository Block (ECRB) have battery backups, therefore these systems were not affected. However, there was some data loss from the Drift-Scale Test. This data loss was primarily heater data which is of relatively minor importance.

In addition to the power outage from the 30th of July event, the site recorded power outages on 19th of August and 26th of August. The 19th of August power outage was storm related and lasted 4-5 hours. The 26th of August outage lasted 12 minutes. In both cases, the onsite backup generators started and supplied power until offsite power was restored. Therefore, there was no loss of scientific data from either outage.

Site Foot Print Reduction

During this reporting period, site operations began a program to reduce the foot print of the facilities supporting Yucca Mountain. As part of this program, more than 500 truck loads of surplus equipment, scrap, and waste will be transported offsite over the next few months.

3.2 Scientific Investigations

The DOE continues to conduct scientific and engineering investigations, or tests, to understand Yucca Mountain's geology, chemistry, hydrology, and other physical aspects and processes that could affect a potential repository's safety, and to provide input to a potential repository's design. DOE uses the results of this work to help form a safety and licensing basis for a potential repository.

Most of DOE's active scientific and engineering investigations are being done through their contracts with the national laboratories and the U.S. Geological Survey (USGS). Table 2 is a list of these currently active or recently completed tests. Included in the list is the reference number of the plan for, and status of, each test at the end of the reporting period.

Also, DOE supports some scientific investigations through funding of Yucca Mountain Project oversight to Nye County, Nevada and Inyo County, California. Under this program, these counties conduct independent scientific investigation programs. These are described under Section 3.5 "Surface Based Field Testing" below.

In addition, the University and Community College System of Nevada (UCCSN) has a cooperative agreement with the DOE's Office of Repository Development to participate in scientific and engineering studies of the Yucca Mountain repository site. A listing of all current and closed UCCSN scientific investigations can be found at: http://hrcweb.nevada.edu/qa/sip.htm.

Furthermore, DOE contracts with Atomic Energy of Canada, Limited (AECL) for scientific investigation of potential repository issues. AECL is currently working on three studies under the DOE QA program. They are: 1) radionuclide transport through tuff samples from Busted Butte; 2) crevice corrosion in titanium, Alloy 22, and stainless steel; and 3) neutron diffraction based measurements of strain in Alloy 22 test specimens.

The status of selected YMP tests are described below.

3.3 Exploratory Studies Facility (ESF) Testing

The excavation of the ESF main drift, completed in 1997, allows the collection of scientific and engineering data at Yucca Mountain. DOE continues testing in the ESF main drift to supply data to support DOE's ongoing scientific studies. Figure 1 shows the ESF test locations. Ongoing ESF testing activities are summarized below.

Alcove 5 (Drift-Scale Test)

In accordance with the established DOE test plan, power to the heated drift was turned off in mid-January 2002, and the 4-year cool-down of the facility is being monitored. At

turn off the surface temperature of Canister 1 was 201.1°C (394°F), the temperature of the rock was 201.1°C (394°F), and the temperature of the air was 204.4°C (400°F). As of the end of this reporting period, the surface temperature of Canister 1 was 80.0°C (176°F), the temperature of rock was 81.1°C (178°F), and the temperature of the air was 83.9°C (183°F). DOE is performing periodic visual and video inspection, water sampling, gas sampling, neutron logging, and electrical-resistance tomography. The data from this test have primarily been used as input to the Thermal Measurements AMR.

3.4 Enhanced Characterization of the Repository Block (ECRB) Testing

The excavation of the ECRB cross drift, completed in October 1998, allows the collection of scientific and engineering data in stratigraphic units that constitute the bulk of the potential repository horizon. DOE continues ECRB testing to supply data to support DOE's ongoing scientific studies. Figure 1 describes the ECRB test locations. ECRB testing activities are summarized below.

Sealed Portion of the ECRB Cross-drift

In an ongoing effort to monitor moisture conditions in the sealed portions of the ECRB, the ECRB bulkheads from Station 22+01 and beyond were closed on November 14, 2001. The bulkhead at Station 17+63 was closed on December 20, 2001. Before the closure of those bulkheads, Project personnel installed enhanced monitoring and collection equipment, including remote cameras and moisture-collection devices, in accordance with the revised test plan. Plastic sheets and drip cloths infused with a pH-sensitive chemical were installed near the crown of the tunnel, and numerous sample bottles were placed to collect possible drips from rock bolts.

DOE reopened the bulkhead at Station 17+63, on June 24, 2002. The main purpose for this entry was to take geotechnical rock property samples and to do a slot test in the lower lithophysal zone between Stations 17+63 and 22+01. The bulkhead at Station 17+63 will be resealed after completion of the sampling and other activities in the ECRB.

An unscheduled entry past the bulkhead at 22+01 was made in January 2003 in response to smoke detected behind the bulkhead (see OR report OR-03-01). Related to the smoke event, and in an effort to remove all heat sources behind the bulkhead, external power to the instrumentation located behind the bulkhead was turned off in February 2003.

DOE conducted an unventilated entry past the sealed bulkheads at 22+01, 25+03, and 25+99, the week of July 7, 2003. The purpose of this entry is to make observations and begin planning to replace the external power sources for the instrumentation with batteries. An OR toured the entire ECRB past the bulkhead at 22+01 on July 8, 2003.

General observations made by the OR were that the ECRB was basically dry from 22+01 to 22+50, a little wet from 22+50 to 23+00, very wet from 23+00 to 24+80, wet from 24+80 to 25+00, very wet from 25+00 to 25+60, and a little wet from 25+60 to 26+70. Although there were no heat sources behind these bulkheads, there was still a zonal distribution of moisture behind the bulkheads.

As a point of reference the fault zone for the Solitario Canyon fault lies between about 25+75 and 26+00. Most of the moisture observed appeared to be condensation on the vent line, steel sets, rock bolts, wiring, and piping in the tunnel. If there was seepage, it would have been difficult to tell with all of the condensation. There was some liquid

water collected (one from a prepositioned sample bottle, and the other from plastic sheeting). Analysis of this water may offer some clue to its origin. It should be noted that the wettest part of the ECRB did not coincide with the fault zone. The observations made by the OR did not provide any conclusive evidence for or against the presence of seepage.

A ventilated entry is planned for the September 2003 to install batteries for the remaining instruments (no cameras). At that time the bulkheads will be resealed for an indefinite period of time. The batteries installed should last in excess of a year.

Alcove 8 (Large Plot Test)

The large plot test started on August 8, 2002. The Large-Plot Test is an infiltration test that uses a metal box, sectioned into twelve compartments, that is placed on the floor of Alcove 8, behind a bulkhead. Water is placed into the compartments to introduce water to the rock formation. This water seeps through about 20 m of the rock formation, which is the upper lithophysal zone and the middle nonlithophysal zone of the Topopah Spring Tuff, and is collected in Niche 3 of the ESF. During this reporting period DOE prepared for tracer application by filling all twelve compartments with water to re-establish flow in each of the twelve infiltration zones. Actual tracers applications are planned to start in October/November 2003.

3.5 Surface-Based Field Testing

Nye County EWDP

The Early Warning Drilling Program (EWDP) was initiated as part of the Nye County Nuclear Waste Repository Project Office Yucca Mountain Oversight program. The purpose of the EWDP is to establish a groundwater monitoring system to protect the residents of Nye County in Amargosa and Pahrump Valleys against potential radionuclide contamination.

The program is also intended to provide geologic and hydrologic information to DOE's Yucca Mountain program. The targeted area is located in the hydrogeologic system south of Yucca Mountain. The questions planned to be investigated are: 1) the origin of spring deposits; 2) the geology and hydraulic properties of valley-floor sediments; 3) the recharge; and 4) groundwater-flow patterns

EWDP Phase IV Status

EWDP Phase IV began the week of October 20, 2002, with the abandonment of wells EWDP-5S and -2D. New wells EWDP-16P, EWDP-27P, and EWDP-28P were drilled and completed from October 2002 to January 2003. During this reporting period two additional Phase IV wells (EWDP-24P and EWDP-29P) were drilled. The borehole at 29P was drilled to a depth of 241 meters (790.65 feet) and terminated in pre-Topopah Spring bedded tuff. The well at 29P was completed at a depth of 120.5 meters (395.3 feet). The borehole at 24P was drilled to a depth of 567 meters (1860 feet). Drilling on the remaining Phase IV well locations is scheduled to begin in November 2003. Detailed information on these wells (when available) and updates to the status of the Phase IV drilling Project can be found at: http://www.nyecounty.com/ewdpmain.htm.

Inyo County Well Drilling

In early April 2003, Inyo County, California, began drilling the first of five deep monitoring wells in the county, as part of its Yucca Mountain oversight program. This

undertaking is entitled the "Inyo County Death Valley Lower Carbonate Aquifer Monitoring Program." The county's rationale for drilling these new wells is to: 1) evaluate regional groundwater flow through the southern Funeral Mountains; 2) establish structural controls on flow paths and discharge areas; and 3) evaluate potential zones of mixing between the deep regional groundwater systems and the local shallow groundwater systems to the northeast. The first of these new wells (Travertine #2) was drilled to a depth of 409 meters (1341 feet). The well has been completed and pump tested, and the USGS collected water samples. This well is located south of Yucca Mountain, in Death Valley National Park. Drilling of the next well in Inyo County is expected to begin in November 2003 at a site near Furnace Creek also in Death Valley National Park.

Pena Blanca (Natural Analog Program)

Drilling commenced in mid-March 2003. All four of the planned exploratory boreholes have been drilled and cored, and the work was concluded. The four wells were completed to just below the water table as test wells for water sampling. Specimens of the core/cuttings will be analyzed at a later date.

Disruptive Events Field Investigation

During this reporting period, the locations for igneous anomalies, to be drilled on Bureau of Land Management (BLM) land in the Crater Flat/Amargosa Valley area, were identified for inclusion in an environmental assessment of the proposed work being prepared for BLM.

3.6 Laboratory Studies

Laboratory Study of Radionuclide Transport in Non-Welded Tuff

During this reporting period, data from the post-migration radiometric analysis on the unsaturated tuff block was obtained at AECL Laboratories. Preliminary results indicate that there may be a change in lithology within the analyzed tuff block, or that chemically reducing activity is occurring in the block.

3.7 Upcoming New Tests and Studies

Bench Scale Vapor Dispersion Test (test plan SITP-03-EBS-001) is scheduled to begin in early fiscal year (F)Y2004 at the DOE Atlas facility in Las Vegas.

4.0 GENERAL ACTIVITIES

4.1 Meetings

NRC/DOE Quarterly Quality Assurance and Management Meetings

On July 15-16, 2003, Office of Nuclear Material Safety and Safeguards staff met with DOE staff to discuss quality assurance and management issues concerning the DOE Yucca Mountain High-Level Waste program. Both sessions were multi-connection video conferences hosted at NRC Headquarters, with connections to the Yucca Mountain Site Characterization Office in Las Vegas, Nevada, the Center for Nuclear Waste Regulatory Analyses in San Antonio, Texas, and, for the quality assurance meeting, with NRC Region IV in Arlington, Texas. Various stakeholders, including representatives from the State of Nevada, Nye County, and industry attended at NRC and DOE meeting locations. General Accounting Office personnel and various stakeholders also participated via telecom. The next quarterly NRC/DOE meetings are scheduled for November 12-13, 2003, in Las Vegas, Nevada.

The purpose of the meeting was to discuss the status of the program at the potential repository site at Yucca Mountain, Nevada. Discussion topics included: (1) DOE's quality assurance program; (2) status of significant corrective actions; (3) program improvements, metrics, and effectiveness regarding the license application, procedural compliance, corrective action program, safety-conscious work environment, and staff accountability; and (4) key technical issues and agreement resolutions. At the conclusion of the QA and management meeting, NRC and DOE reviewed the status and disposition of relevant action items.

Meeting with National Academies' Transportation of Radioactive Waste Committee

On July 24-25, 2003, the Spent Fuel Project Office (SFPO) participated in the second public meeting of the National Academies' Transportation of Radioactive Waste Committee in Las Vegas, Nevada. The study this committee has undertaken is a National Academy of Sciences' self-initiated review of the comparative risks entailed by transportation of spent nuclear fuel. Several Federal agencies, including NRC, support this effort. Specifically, SFPO provided information related to the Baltimore tunnel fire and vulnerability reviews of transportation casks. The presentation provided a general overview referencing the use of realistic analyses. The State of Nevada made several presentations, and informed the Committee that it will be issuing a report on NUREG/CR-6672, "Re-examination of Spent Fuel Shipment Risk Estimates." In addition, representatives from Nye and Clark counties, the towns of Beatty and Caliente, local Native American tribes, and various stake holder organizations made presentations. These presentations generally focused on the need for DOE to reach prompt decisions on the transportation mode and routes.

4.2 Site Visits

On July 2, 2003, an OR took a group of five NRC and CNWRA employees on a tour of Yucca Mountain to familiarize them with the Project.

An OR visited the site on July 8, 2003, to participate in the unventilated entry behind the bulkhead in the ECRB. See description of observations under Section 3.4 above.

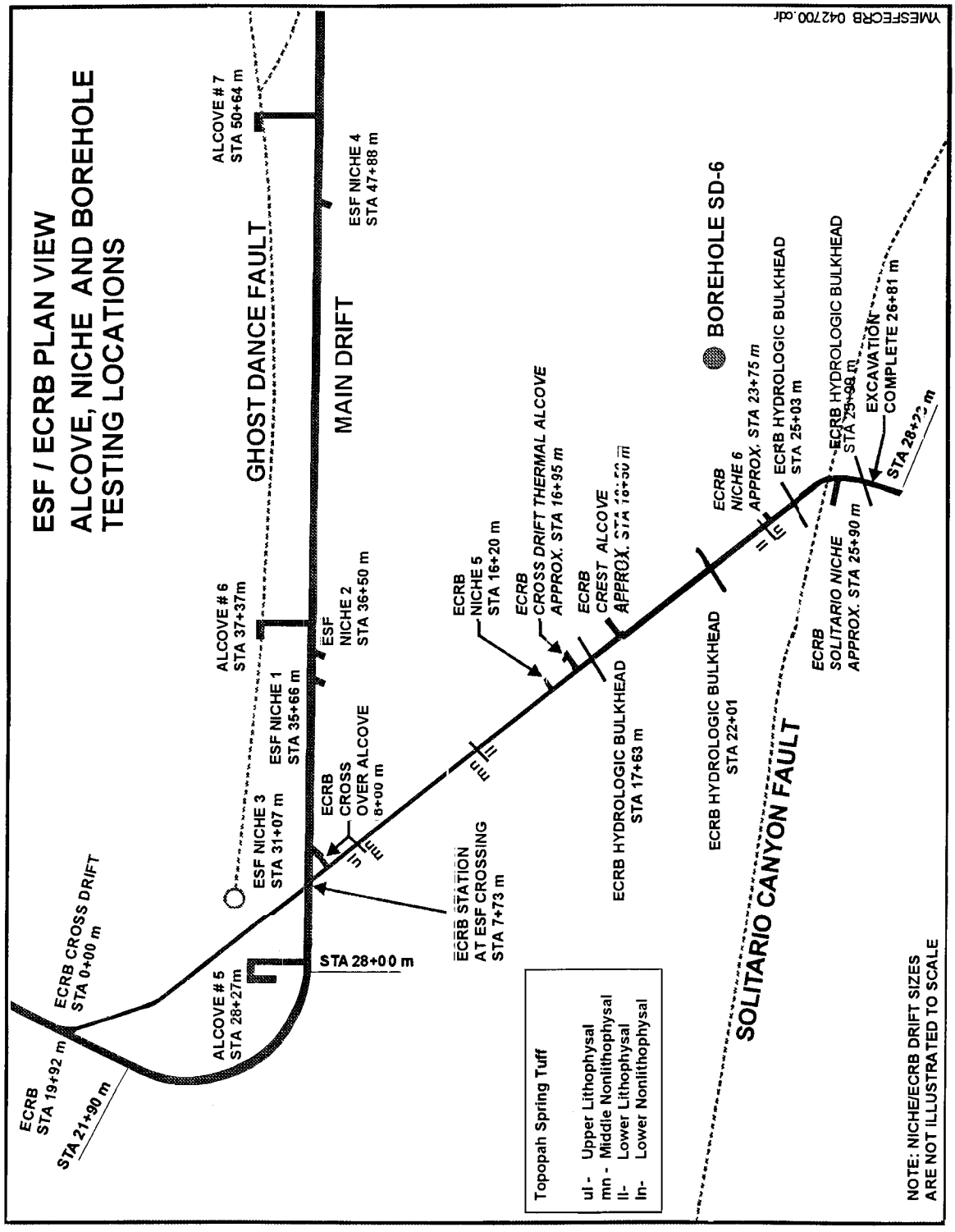
ESF / ECRB PLAN VIEW
ALCOVE, NICHE AND BOREHOLE
TESTING LOCATIONS
GHOST DANCE FAULT
MAIN DRIFT
BOREHOLE SD-6
SOLITARIO CANYON FAULT
ECRB CROSS DRIFT STA 0+00 m
ECRB STA 19+92 m
STA 21+90 m
ALCOVE # 5 STA 28+27m
STA 28+00 m
ALCOVE # 6 STA 37+37m
ESF NICHE 3 STA 31+07 m
ESF NICHE 1 STA 35+66 m
ESF NICHE 2 STA 36+50 m
ECRB CROSS OVER ALCOVE 8+00 m
ALCOVE # 7 STA 50+64 m
ESF NICHE 4 STA 47+88 m
ECRB STATION AT ESF CROSSING STA 7+73 m
ECRB NICHE 5 STA 16+20 m
ECRB CROSS DRIFT THERMAL ALCOVE APPROX. STA 16+95 m
ECRB CREST ALCOVE APPROX. STA 16+50 m
ECRB HYDROLOGIC BULKHEAD STA 17+63 m
ECRB HYDROLOGIC BULKHEAD STA 22+01
ECRB NICHE 6 APPROX. STA 23+75 m
ECRB HYDROLOGIC BULKHEAD STA 25+03 m
ECRB SOLITARIO NICHE APPROX. STA 25+90 m
ECRB HYDROLOGIC BULKHEAD STA 25+90 m
EXCAVATION COMPLETE 26+81 m
STA 28+22 m
Topopah Spring Tuff
ul - Upper Lithophysal
mn - Middle Nonlithophysal
ll- Lower Lithophysal
ln- Lower Nonlithophysal
NOTE: NICHE/ECRB DRIFT SIZES ARE NOT ILLUSTRATED TO SCALE
YMESFECRB 042700.cdr

Figure 1

U.S. NRC On-Site Licensing Representatives' Tracking Report for Open items Followed in Bi-Monthly OR Report

TABLE 1

(For NRC tracking only) AOI-YMSCO-ARC-02-12-01	Identifies the need for DOE OQA to ensure that procedure development and review process includes a documented evaluation to verify compliance with the requirements of the Project's QARD	OR Report No. OR-03-01	Date Item Closed: **OR Report No.: OR-03-03** **August 15, 2003**
OR Open Item 03-05	The continued use of unqualified software in quality affecting technical products appears to be on conflict with the governing requirements of the implementing procedures and the QARD.	OR Report No.: OR-03-04	Date Item Closed:
OR Open Item 03-04	With a tentative date of mid June to evaluate CAR BSC(B)-03-(C)-107, the RCD has not timely performed action to this CAR, it has remained open for four months without resolution.	OR Report OR-03-03	Date Item Closed:
OR Open Item 03-03	An evaluation in DOE's progress in implementing corrective actions associated with CAR BSC-01-C-001, concerning model validation -the OR reviewed TWPs (approx. 43 models). Based on the results, it could not be established if the evaluation criteria will result in the development of models with adequate confidence for LA.	OR Report No. OR-03-02	Date Item Closed:
OR Open Item 03-02	During a review of the MII confirmation packages, it was identified that the action statement execution task descriptions and completion schedules for many of the reviewed pkgs., had been modified without appropriate justification. Therefore, pending the resolution of this apparent deviation from a commitment to administer the MII in accordance with the requirements of AP-5.1Q, this issue is identified as this OR Open Item.	OR Report No. OR-03-02	Date Item Closed:
OR Open Item 03-01	This Open Item is based on issues on separate DRs: 1) the effective resolution of concerns related to inadequate personnel training; 2) the failure to establish an effective transition plan; and 3) the evaluation of the SCWE issues.	OR Report No.: OR-03-01	Date Item Closed: **OR Report No.: OR-03-04** **Issue 1 & 2 Closed** **October 20, 2003**
OR Open Item 02-13	The current status of corrective & preventive actions associated w/CAR #BSC-02-C-01 revealed that not all corrective actions stated had been complete.	OR Report No: OR-02-05	Date Item Closed:

U.S. NRC On-Site Licensing Representatives' Tracking Report for Open items Followed in Bi-Monthly OR Report

TABLE 1

OR Open Item 02-12	Contrary to requirements of the QARD Supplement III 2.4.Cprocedure AP-SIII.2Q inappropriately allows for the use of unqualified data - BSCQA procedure change control program failed to identify this issue.	OR Report No: OR-02-05	Date Item Closed:
OR Open Item 02-11	Based on surveillance not identifying specific problems w/Soft-ware functionality for codes tested, 7 including NUFT did not pass ITP and/or VTP surveillance.	OR Report No: OR-02-05	Date Item Closed:
OR Open Item 02-10	Pending appropriate evaluation & documentation of the design control attributes associated with requirements of 10CFR §63.44 and Part 21	OR Report No: OR-02-04	Date Item Closed:
OR Open Item 02-09	Pending revision of engineering procedures, to include appropriate design verification considerations.	OR Report No: OR-02-04	Date Item Closed:
OR Open Item 02-08	The required performance of annual audits' justification for delaying a scheduled audit of YMSCO for 3-months with an additional extension does not appear to be adequately supported. - Deviation from requirement of Sub-section 18.2.1 E of the QARD.	OR Report No: OR-02-04	Date Item Closed: **OR Report No.: OR-02-06** **January 23, 2003**
OR Open Item 02-07	Model Validation Impact Assessment - addressed the effect of inappropriately validated models on TSPA-SR. Many cases of impact assessments used TSPA-SR results to evaluate the local impacts. It's unclear how this practice evaluated the cumulative impact of all the models in question.	OR Report No: OR-02-01	Date Item Closed:
OR Open Item 02-06	Unqualified Data Impact Assessment - NRC staff identified unqualified data that could be replaced with qualified data for the performance assessment. For risk-significant components, an evaluation of unqualified data that is replaced with qualified data would help determine if efforts should be under-taken to qualify the removed data.	OR Report No: OR-02-01	Date Item Closed:

U.S. NRC On-Site Licensing Representatives' Tracking Report for Open items Followed in Bi-Monthly OR Report

TABLE 1

OR Open Item 02-05	Provisions are in place that allow for model validation to continue past issuance of the documentation. The models used in the performance assessment should have adequate support for their representation at the time the performance assessment documentation is issued.	OR Report No: OR-02-01	Date Item Closed:
OR Open Item 02-04	Number of criteria have been developed related to various forms of review. If a review is relied upon for model validation, it should be directed at validating the model and it should encompass the full body of information to the extent practical.	OR Report No: OR-02-01	Date Item Closed: **OR Report No.: OR-03-01** **April 14, 2003**
OR Open Item 02-03	More objective criteria (comparison to data not used in the development of the model) typically results in higher confidence in model validation are not distinguished from the more subjective, problematic criteria.	OR Report No: OR-02-01	Date Item Closed:
OR Open Item 02-02	Current process controls specify that one or more of 9-criteria may be utilized to validate a model. All of the criteria should in-crease confidence in the modeling process, some criteria do not appear to be appropriate for addressing whether the model is valid for its intended use.	OR Report No: OR-02-01	Date Item Closed: **OR Report No.: OR-03-01** **April 14, 2003**
OR Open Item 02-01	Failure to properly include the specific issues identified in the Concerns Program Final Report in the resolution process may result in not adequately addressing the original employees concern.	OR Report No: OR-02-01	Date Item Closed: **OR Report No.: OR-02-06** **January 23, 2003**

CURRENT TEST ACTIVITIES BY SCIENTIFIC INVESTIGATION TEST PLAN

Table 2

Test Plan Title	Test Plan Identifier	Test Plan Status
Ash Redistribution Studies and Field Studies of Lava Morphology & Igneous Processes	SITP-02-DE-001	Test ongoing
Bench Scale Vapor Dispersion Test Plan	SITP-03-EBS-001	Test scheduled to start in early FY04
Construction Monitoring Equipment Installation and Data Collection	SITP-03-EBS-002	Test ongoing
Atlas Natural Convection Test	SITP-02-EBS-002	Field testing complete, reports in process
Field Thermal Conductivity Testing	SITP-02-EBS-003	Test ongoing
Reactive Transport Column Experiments	SITP-02-EBS-004	Laboratory tests complete, report in process
Atlas Breached Waste Package and Drip Shield Experiments	SITP-02-EBS-005	Testing complete, report at Rev 00c
Laboratory Thermal Conductivity Testing	SITP-02-EBS-006	Testing complete, report at Rev 00b
TSW Fracture and Lithophysal Studies	SITP-02-ISM-001	Test ongoing
Geologic Mapping of Southern Expansion and Jet Ridge	SITP-02-ISM-002	Test deferred to 2005
Natural Analogs	SITP-02-NA-001	Test ongoing
Rock Modules Testing	SITP-02-SSD-001	Test complete, report being prepared for Rev 00a
Mechanical Properties Laboratory Investigations	SITP-02-SSD-002	Test ongoing
Ground Support Testing	SITP-02-SSD-003	Test ongoing
Lithostratigraphic Studies in Cooperation with Nye County Co. EWDP	SITP-02-SZ-001	Test ongoing
Hydrologic/Hydrochemistry Studies in Cooperation with Nye Co. EWDP	SITP-02-SZ-002	Test ongoing
Alluvial Testing Complex- Single-well, Multi-well, and Laboratory Studies	SITP-02-SZ-003	Test deferred
[Studies in Cooperation with Inyo County Borehole Program]	New test plan will be developed	
Laboratory Sorption Measurements- SZ	SITP-02-SZ-004	Test Report due 2003
Moisture Monitoring in the ECRB Bulkhead Cross Drift	SITP-02-UZ-001	Test ongoing
Niche 5 Seepage Testing	SITP-02-UZ-002	Testing complete, SITP to be decontrolled
Alcove 8 Flow & Seepage Testing	SITP-02-UZ-003	Test ongoing
Systematic Hydrologic Characterization	SITP-02-UZ-004	Test deferred to 2005

Test Plan Title	Test Plan Identifier	Test Plan Status
36Cl Validation	SITP-02-UZ-005	Field testing complete report ongoing
Busted Butte Transport Testing	SITP-02-UZ-006	Testing complete, SITP to be decontrolled
UZ Hydrochemistry Investigation	SITP-02-UZ-007	Test deferred to 2005
Fluid Inclusion Studies	SITP-02-UZ-009	Test deferred to 2005
Moisture Monitoring Investigation and Alcove 7 Studies	SITP-02-UZ-010	Test ongoing
Laboratory Sorption Investigation-UZ and SZ	SITP-02-UZ-011	Test deferred to 2005
D1rift Scale Test	SITP-02-UZ-012	Test ongoing
Laboratory Flow/Coupled Process Block Experiments	SITP-02-UZ-013	New SITP
Niche 4 Seepage Testing	SITP-02-UZ-015	Test complete, SITP to be decontrolled
Commercial Spent Fuel and Fuel Rod Segment Degradation and Radionuclide Release in Long Term Tests	SITP-02-WF-001	Test ongoing
DHLW Degradation and Radionuclide Release in Long-Term Tests	SITP-02-WF-002	Test ongoing
Waste Form Colloids Characterization and Concentration Studies	SITP-02-WF-003	Test ongoing
Validation of Dissolved Radionuclide Concentration	SITP-02-WF-004	Test ongoing
CSNF Oxidation Testing	SITP-02-WF-006	Test ongoing
CSNF Flow-Through Dissolution Testing	SITP-02-WF-007	Test ongoing
CSNF Colloid Release Testing	SITP-02-WF-008	Test ongoing
PNNL Dissolved Concentration Validation Testing	SITP-02-WF-009	Test ongoing
Waste Package and Drip Shield Materials Testing	SITP-02-WP-001	Test ongoing
Waste Package Environment Investigations – Dust Geochemistry	SITP-02-WP-008	Test ongoing
Microclimate Records in Fracture Minerals	SITP-03-UZ-016	Test deferred